

Abstract of the disclosure

Silicon dioxide (SiO_2) films are deposited at room temperature using a chemical vapor deposition (CVD) reaction catalyzed by ammonia or a Lewis base. The SiO_2 film growth is accomplished through the reaction of water and certain silicon precursors. Examples of these reactions include the $\text{SiCl}_4 + 2\text{H}_2\text{O} \rightarrow \text{SiO}_2 + 4\text{HCl}$ or $\text{Si}(\text{OR})_4 + 2\text{H}_2\text{O} \rightarrow \text{SiO}_2 + 4\text{ROH}$ reactions and catalyzed with ammonia (NH_3) or other Lewis bases. The NH_3 catalyst lowered the required temperature for SiO_2 CVD from $> 900 \text{ K}$ to $313\text{-}333 \text{ K}$ and reduced the SiCl_4 and H_2O pressures required for efficient SiO_2 CVD from several Torr to $< 500 \text{ mTorr}$.

106290-55696860